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A Theoretical Model of the Relationship Between Organizational Culture and Quality Management Techniques

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Abstract

Quality Management (QM) is adopted by companies as part of their strategy to improve performance. Although there is evidence of the positive relationship between QM and firms' performance, the cases of unsuccessful and non-sustained quality initiatives are significant. Among factors listed as key factor of these results, Organizational Culture (OC) is often cited. This study aims to present a theoretical model of the relationship between organizational culture and quality management techniques. Based on literature review, hypotheses were developed identifying which QM techniques would be more suitable according to organizational cultures' profile. To investigate the proposed theoretical model and hypotheses it was developed a questionnaire which was tested for reliability. In doing so, this study also provides an instrument to collect data to study this relationship. Future empirical studies will be performed to provide more evidence about the relationship between OC and QM techniques and also to investigate the impact of this relationship on firms' performance.

Keywords: Quality Management Techniques, Organizational Culture, Competing Values Framework.

1. Introduction

In an attempt to improve quality and performance, many companies have focused on Quality Management (QM) initiatives. Much has been written on the benefits of QM to improve organizational performance (Baird et al., 2011; Naor et al., 2008; Prajogo & McDermott, 2011; Sila, 2007). However, in spite of these claimed benefits, a closer examination of the literature shows that several QM initiatives have not achieved the intended results (Asif et al., 2009; Beer, 2003; Harari, 1993; Hubiak & O'Donnel, 1996; Rad, 2006). Sousa and Voss (2002) state that the differences among the results come from the, often considered, universal approach of QM, where the whole set of its initiatives would be universally applicable to any organization. Nevertheless, many authors (Beer, 2003; Maull et al. 2001; Sousa & Voss, 2002; Wu et al., 2011) have questioned this universal approach, suggesting that to study the impact of contextual variables in organizations would be useful to understand different results from the QM initiatives.

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Among several contextual variables which have been attributed as an important factor of QM success, Organizational Culture (OC) is highlighted (Asif et al., 2009; Baird et al., 2011; Irani, 2004; Kull & Wacker, 2010; Rad, 2006; Wu et al., 2011), which is why many companies are now taking their cultural characteristics into account prior to implementing QM initiatives (Maull et al., 2001).

Recent studies, such as the one conducted by Prajogo & McDermott (2005), have investigated the relationship between QM practices (i. e. Leadership, Strategic Planning, Customer Focus, Information and Analysis, People and Process Management) and OC with the purpose of identifying the particular cultures that determine the successful implementation of QM practices. Findings show that different subsets of these practices are determined by different types of cultures. Studies from Zu et al., (2010) also revealed the differential effects of the culture types on the implementation of QM practices. In the same way, Naor et al., (2008) also highlighted the importance of accounting for culture when making decisions to implement quality practices to achieve performance advantage.

Even though these studies show OC as an important contextual variable, they often have been made at quality practice level. To study quality in this level implies considering elements which are more challenging to measure and define such as leadership and process management. Despite the widespread acknowledgement of the important role of organizational culture for a successful QM implementation, there is a gap in the empirical literature examining the association between organizational culture and the adoption of QM at the level of techniques. Accordingly, the objective of this study is to examine the relationship between OC and QM techniques.

Hypotheses and theoretical model were developed based on the literature review which was also useful to devise a questionnaire. Then, it was pilot tested using an email based survey with a small sample. Methodology of research also included interviews with two academic specialists on QM whose inputs were considered to the questionnaires' development.

2. Hypotheses development and theoretical model

The Competing Values Framework (CVF) has been used in several studies as a method of analyzing organizational culture and also applied to issues such as leadership development and organizational change (Denison & Spreitzer, 1991). More recently, it has also been used in Quality Management studies such as the one by Deter et al., (2000), Naor et al., (2008); Prajogo and McDermott, (2005); Wu et al., (2011) and Zu et al., (2010).

This framework is based on two main dimensions: one that reflects the competing of flexibility and control and the other where the competing is created by the internal organization versus the external environment. The juxtaposition of these two dimensions leads to four different cultural profiles (Cameron & Quinn, 2006; Denison & Spreitzer, 1991):

- Group culture: focus on flexibility and the internal organization. It has trust and participation as core values, and human potential development is its effectiveness criteria.
- Developmental culture: also focused on flexibility, however it is oriented to creativity and adaptation to the external environment. This culture has growth, development of new markets, and resource acquisition as effectiveness criteria.
- Hierarchical culture: this culture is oriented to internal efficiency and uniformity, that is, focus on the internal organization. It has control as the main value. Therefore, stability and efficiency are its effectiveness criteria.
- Rational culture: also focused on control, however it is oriented to the external environment. This culture has competition and the successful achievement as core values. Productivity is the effectiveness criteria of rational culture.

2.1. Hypotheses development

Benchmarking is a quality technique used to identify and stimulate the best practice adoption which leads to better results. This technique is aligned to QM since it determines what customers can expect and also learn new

ways to perform a process. Because benchmarking appears to be related to external focus, it best matches with the characteristics of developmental culture which emphasizes flexibility, innovation and creativity. In other words, it would be useful for continuous improvement and development of new standards. The rational culture also focuses on external environment and one of its primary motivations is competition.

FMEA (Failure Mode and Effects Analysis) is a process for identifying likely defects before they occur, finding their causes and effects with the purpose of minimizing or eliminating them. This technique is used not only for process and product development, but also to attempt to improve them. In doing so FMEA seems to be adequate to culture which emphasize external environment. Developmental culture is oriented toward innovation and agility; therefore, FMEA is aligned to it concerning development of new products and processes.

In rational culture, there is also a focus on external environment, but it emphasizes control and stability. Since FMEA is useful to identify errors before they occur, it is important for control and stability. Besides that, this technique is linked to productivity and performance improvement, which are aspects directly related to this culture

QFD (Quality Function Deployment) for being a technique that deals with process and product design also is related to cultures which emphasize the external environment. Therefore, it seems to be more aligned with rational and developmental culture. Developmental culture has innovation as strategy to create new standards, thus QFD is useful to help an organization to respond quickly to customers' needs and wants. All things considered, it is then proposed that:

H1a: Rational culture is positively related to Benchmarking, FMEA and QFD.

H1b: Developmental culture is positively related to Benchmarking, FMEA and QFD.

Brainstorming is used by groups to generate ideas about issues such as the potential cause of a problem, possible solutions, process improvement, etc. In general, the use of this technique is aligned with leaders who facilitate interaction through groups' members, communication and participation.

Kaizen underscores the importance of improvements in the organization. Hoang et al., (2006) reinforce that Kaizen is people-based, and consequently the success of it depends on people. The concept of Kaizen can be operationalized in a Kaizens' event technique that involves systematic initiative of continuous improvement by a multidisciplinary group in a short period of time.

Then, both Brainstorming and Kaizens' event fit better with group and developmental culture because, as stated by Prajogo and McDermott (2005), this culture emphasizes openness, participation, cohesiveness and commitment to membership. Moreover, these techniques are also related to developmental culture which has creativity and improvement as a core value. Thus, the following hypotheses are proposed:

H2a: Group culture is positively related to Brainstorming and Kaizens' event.

H2b: Developmental group is positively related to Brainstorming and Kaizens' event.

The 5S focuses on implementing visual order, organization, cleanliness and standardization which creates a continuous process for improving the work environment. Much of this technique is related to social aspects in the organization (i.e. self-discipline), thus an organization which has a concern about member commitment seems to support this technique. Besides that, the adoption of 5S can contribute to improving stability, control and efficiency in the work environment which is aligned to hierarchical culture.

Visual control is any communication device used to show how work should be done and whether there is any deviation from the standard, it helps to ensure fast and proper execution of operations and processes (Liker, 2005). Companies must ensure fast feedback of the results to prompted actions, and then they have to provide ways for open communication and employee involvement. Taking this into account, visual controls are good tools for that because they allow not only information dissemination and alignment, but also employee commitment. For these reasons, they match adequately to group and hierarchical culture.

Quality tools are several techniques (i.e. cause-and-effect diagram, PDCA, Pareto chart) that support the process improvement in organization; these techniques help employees to use their knowledge effectively. Generally speaking, quality tools are ways to obtain process improvements; in doing so their use is related to internal environment. Cameron and Quinn (2006) claim that an organization requires the application of techniques such as quality tools which seek control and efficiency to foster higher levels of quality. Therefore, these techniques tend to obtain success for both cultures: hierarchical and group. This discussion suggests that:

H3a: Group culture is positively related to 5S, Quality tools and Visual control.
H3b: Hierarchical culture is positively related to 5S, Quality tools and Visual control.

Statistical techniques are often used to detect causes which contribute to the variation in manufacturing quality, to provide useful information for product design, and to determine capability. The usage of these techniques to control process and determine capability, for instance, is related to control and stability emphasis. In doing so, they match better to rational and hierarchical culture. For the first, because it is oriented toward efficiency, stability and control and the latter, because the use of statistical techniques is aligned to goal fulfillment, and achievement, core values of rational culture.

Effectiveness and efficiency concepts are both related to performance measurement which can be defined as stated by Neely et al., (2005) as the act of quantifying the efficiency and effectiveness of action, which leads to performance. Since both concepts are directly related to this technique, it fits to hierarchical and rational cultures.

Preventive maintenance is activities made after a specified period of time or machines' use which relies on the estimated probability that the equipment will breakdown. This technique contributes to a stable and controlled production flow for decreasing the probability of unexpected breakdown then it is related to cultures which have control and stability as a main focus.

Mistake-proof devices or poka-yoke refers to devices that reduce or avoid the possibility of error. Then, their use is related to cultures oriented to stability and control. Therefore, hierarchical and rational culture seems to be adequate for their use. Mistake-proof devices fit hierarchical culture, which seeks a smooth production flow, and to rational culture which is oriented toward productivity. Thus, the following hypothesis is offered:

H4a: Rational culture is positively related to the use of statistical techniques, performance measurement, preventive maintenance and use of mistake-proof devices.

H4b: Hierarchical group is positively related to the use of statistical techniques, performance measurement, preventive maintenance and use of mistake-proof devices.

2.2. *Theoretical Model*

Quality techniques were split into groups according to the culture they were related to in the hypotheses. Figure 1 presents the theoretical model where each path in it is labeled with the associated hypotheses.

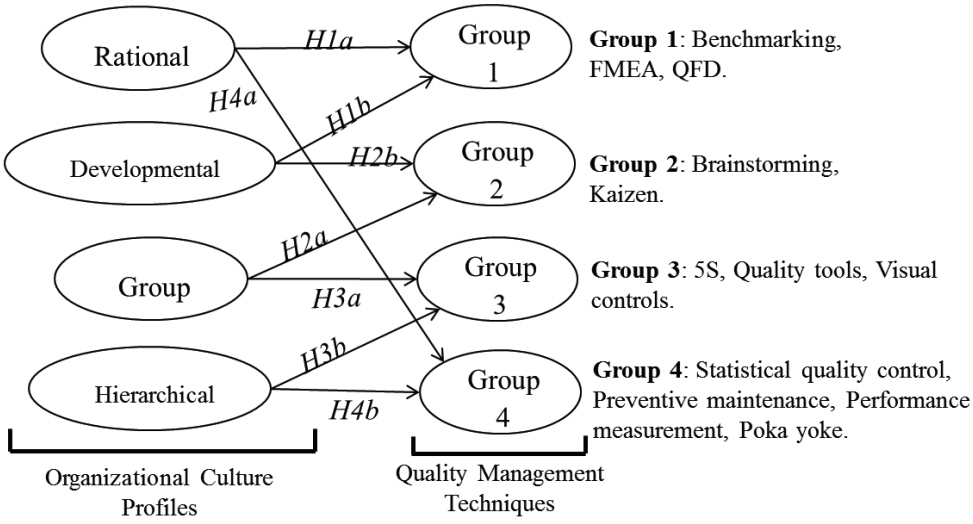

Figure 1. Theoretical model of the relationship between organizational culture and quality management techniques

3. Developing the instrument

The questionnaire was developed to collect information concerning QM and OC with the purpose of being useful to study the relationship between both issues. The domains of dimensions and variables used in the instrument were identified based on literature review. For the items of the QM dimension, the survey instruments used by Ahire et al., (1996), Flynn et al., (1994), Naor et al., (2008) and Zu et al., (2010) were useful. In addition, some other items were taken from the literature review. For the Organizational Culture dimension, the survey instruments used by Cameron and Quinn (2006), Naor et al., (2008); Prajogo and McDermott, (2011) and Zu et al., (2010) were useful to define the measured items. The measurement approach used a five-point Likert scale which is similar to the work of Flynn et al., (1994), Prajogo and McDermott, (2011) and Zu et al., (2010).

This instrument was pilot tested using a small random sample of 12 respondents from Brazilian companies. For this pilot test were chosen respondents who were familiar with the topics investigated (i.e. quality and production managers). Since the sample test was small, statistical analyses were restricted to Cronbach's alpha. This test is important because it is a measurement of the instruments' reliability (Hair et al., 2009). Statistical calculations were performed using the IBM SPSS Statistics 19 software; values of Cronbach's alpha obtained for each factor were satisfactory, most of them exceeding the threshold value of 0.70 suggested by Hair et al., (2009). Additional interviews were performed to evaluate the questionnaire which was considered appropriate to be used in a large-scale survey according to preliminary reliability test and specialist's feedback.

4. Conclusion

This paper focuses on organizational culture as a context-dependent variable in quality management initiatives considering, in particular, quality tools. As stated by Wu et al., (2011), considering contextual variables may mean there is no best way to implement quality initiatives to cater for all organizations. Much has been written about the impact of OC on the successful implementation of QM, however, these studies emphasize quality practices. With this in mind, this study identifies four groups of quality techniques according to cultural features which could better support them, and then, provides a theoretical model indicating the relationship between these organizational cultures' profiles and QM techniques.

To consider this relationship at quality technique level is important since these techniques can affect several dimensions of performance as argued by Handfield et al., (1999), besides that, quality techniques are elements more tangible and measurable than quality practices (i.e. leadership and process management). This study suggests a selective adoption of quality management techniques according to firms' cultural characteristics, which could lead to a better performance. Moreover, it reinforces that quality initiatives based on "one sizes fit all", that is, the universal approach of quality management, is not applicable.

In summary, this study contributes to highlight the importance of considering organizational culture in the quality initiatives. Additionally, the questionnaire devised will be used to gathering empirical data to study this relationship. The study has limitation which provides opportunities for further research. The main is that the results were based on the literature review. However, this paper reports the first stage of a larger study whose further research will be undertaken using empirical data; future studies will also include the effect of this relationship on firms' performance.

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